## REMARKS

### Priority Under 35 U.S.C.§ 119

The Examiner has acknowledged that a claim for foreign priority under 35 U.S.C. § 119 has been made but has noted that a certified copy of the priority document has not been received. Undersigned believes that she provided a certified copy of the priority document in the parent application from which this application before the Examiner was divided pursuant to a restriction requirement. However, the undersigned has ordered another certified copy of the priority document and will forward it to the Examiner upon her receipt of it.

### Information Disclosure Statement

Applicant appreciates the Examiner's thorough review of the documents cited in Applicant's information disclosure statement and the Examiner's notation that a copy of one of the documents was not found in the file. Another copy of that document with a supplemental information disclosure statement is attached.

### Claim Rejections—35 U.S.C. § 102—Son '122

The Examiner has rejected claims 1-16 under 25 U.S.C. § 102(b) as being anticipated by Son et al. 4,539,122 (the Son '122 reference or 'Son '122). Specifically, the Examiner has stated that Son '122 "teaches a drilling fluid additive comprising ferrous gluconate," citing column 1, lines 3-35 and the abstract. The Examiner has further explained that "Applicants discovery of a new property of an old composition cannot distinguish over the prior art," citing *In re Tomlinsin*, 150 U.S.P.Q. 623.

Applicant respectfully traverses the Examiner's rejections. Anticipation requires **identity** of the invention. *Glaverbel Société Anonyme v. Northlake Marketing & Supply Inc.*, 45 F.3d 1550, 33 U.S.P.Q.2d 1496 (Fed. Cir. 1995)(emphasis added). Such identity is lacking with respect to the Son '122 reference.

The Son '122 reference cited by the Examiner fails to "disclose every element of the challenged claim" as necessary for the reference to anticipate the claims. *PPG Industries, Inc. v. Guardian Industries Corp.*, 75 F.3d 1558, 37 U.S.P.Q.2d 1618 (Fed. Cir. 1996); *Leinoff v. Louis Milona & Sons, Inc.*, 7226 F.2d 734, 220 U.S.P.Q. 845 (Fed. Cir. 1984). The law is well settled that "to anticipate, every element and limitation of the claimed invention must be found in a single prior art reference, arranged as in the claim." *E.g., Brown v. 3M*, 265 F.3d 1349, 60 USPQ2d 1375 (Fed. Cir. 2001); *Electro Med. Sys. S.A. v. Dooper Life Sciences*, 34 F.3d 1048,

1052, 32 U.S.P.Q.2d 1017, 1019 (Fed. Cir. 1994) ("anticipation under 35 U.S.C. § 102 requires the disclosure in a single piece of prior art of each and every limitation of a claimed invention").

The Federal Circuit has repeatedly indicated that to find anticipation of claims, prior art embodiments must possess the properties expressly recited in the claims. Property limitations can serve to distinguish claimed subject matter from other products. *E.g., E.I du Pont de Nemours & Co. v. Phillips Petroleum Co.*, 849 F.2d 1430, 7 U.S.P.Q.2d 1129 (Fed. Cir. 1988). Applicants respectfully submit that the Examiner can not satisfy the requisites of 35 U.S.C. § 102 by attributing Applicants' teachings to a prior art reference. Additionally, "[a]nticipation of inventions set forth in product claims cannot be predicated on mere conjecture respecting the characteristics of products that might result from the practice of processes disclosed in references." *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 U.S.P.Q. 303 (Fed. Cir. 1983), *citing In re Felton*, 484 F.2d 495, 500, 179 U.S.P.Q. 294, 298 (C.C.P.A. 1973).

Quoting the Federal Circuit: "The courts have not upheld arguments based on "inherent" properties when there is no supporting teaching in the prior art." *In re Dillon*, 892 F.2d 1554; 13 U.S.P.Q.2d 1337 (Fed. Cir. 1989), *citing* W.L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 1555, 220 U.S.P.Q. 303, 314 (Fed.Cir. 1983), *cert. denied*, 469 U.S. 851, 83 L. Ed. 2d 107, 105 S. Ct. 172 (1984) (emphasis added). Inherent anticipation requires that the missing descriptive material is "necessarily present," not merely probably or possibly present, in the prior art. *In re Robertson*, 169 F.3d 743, 745, 49 U.S.P.Q.2d 1949, 1950-51 (Fed. Cir. 1999) (*citing Continental Can Co. USA, Inc. v. Monsanto Co.*, 948 F.2d 1264, 1268, 20 U.S.P.Q.2d 1746, 1749 (Fed. Cir. 1991)). "In addition, the prior art reference must be enabling, thus placing the allegedly disclosed matter in the possession of the public." *Akzo N.V. et al. v. U.S. International Trade Commission*, 808 F.2d 1471, 1 U.S.P.Q.2d 1241 (Fed. Cir. 1986), *citing In re Brown*, 51 C.C.P.A. 1254, 329 F.2d 1006, 1011, 141 U.S.P.Q. 245, 249 (CCPA 1964).

A single prior art reference anticipates a patent claim only if it expressly or inherently describes each and every limitation set forth in the patent claim. *Trintec Industries, Inc. v. Top-U.S.A. Corp.*, 295 F.3d 1292; 63 U.S.P.Q.2d (BNA) 1597 (Fed. Cir. 2002), *citing Verdegaal Bros., Inc. v. Union Oil Co.*, 814 F.2d 628, 631, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987).

Applicant respectfully submits that the Son '122 reference does not meet these requirements for any of Applicants' claims. Each of claims 1-5 rejected by the Examiner in view of this reference requires a pH greater than 9. The Son '122 reference requires a pH less

than 8. Column 2, lines 65-67 ("The corrosion inhibitor of the present invention is effective in acidic and about neutral solutions.") and Column 3, lines 2-4 ("the general pH range in which the corrosion inhibitor of the present invention is utilized is from about 0 to about 8.").

Moreover, the corrosion inhibitor of the Son '122 reference is to retard corrosion of metals in contact with heavy brine solutions, particularly aqueous solutions of zinc halides such as zinc chloride or zinc bromide, or potassium halides, sodium halides, or calcium halides. In contrast, Applicant provides an iron (II) based hydrogen sulphide scavenger chelated with a gluconate chelating agent as a sulphide scavenger in a polymer based drilling mud. The Son '122 reference fails to teach or suggest use of ferrous gluconate in a polymer based drilling mud for any purpose and particularly not for Applicant's purpose of scavenging sulphide.

To use iron as a sulphide scavenger, the iron must be precipitated as sulphide, not hydroxide. When iron is precipitated as a hydroxide, the precipitate is a gelatinous material which would interfere with the viscous properties of the drilling mud in an undesirable way, and still would not effectively remove the sulphide. Iron salts, such as ferrous chloride, are soluble in water, but the solubility is a function of pH. For example, at pH 5-6, ferrous iron will remain in solution but at pH above that range the iron will be precipitated as the hydroxide. In order to stabilize iron in solution at higher pH, it is necessary to complex the iron ions with suitable complexing agents. But the stability of the various complexes that can be used depends upon pH. The higher the pH, the more likely it is that the iron will be precipitated as iron hydroxide. And the fact that an iron complex is stable up to pH 8 does not mean that it will be stable up to pH 12, for example. Typically, if a drilling mud is being used in a subterranean zone in which hydrogen sulphide is expected to be encountered, the mud will be formulated to have a very high pH (at least 11.5) in order to suppress the evolution of hydrogen sulphide gas.

Although Applicant respectfully submits that these reasons make clear that the Son '122 reference does not have identity with and therefore cannot anticipate the invention as claimed in Claims 1-5, to be responsive to the Examiner's rejections and to further distinguish and claim the invention, Applicant has amended claims 1-5 to focus the claims on a polymer based drilling fluid comprising the chelated scavenger rather than on an additive independent of the particular drilling fluid for which the additive is intended. Applicant respectfully requests the Examiner to enter these amendments and reconsider the claims.

U.S. Serial No. 10/781,389 (Attorney Dkt: HALB:001D1)
Art Unit: 1712; Examiner TUCKER, PHILIP C.

**Claim Rejections—35 U.S.C. § 102—Son '693**

The Examiner has rejected claims 1-16 under 35 U.S.C. § 102(b) as being anticipated by Son et al 4,526,693 ("the Son'693 reference" or "Son '693"). In support of his rejections, the Examiner has stated that "Son teaches a drilling fluid which comprises a cross-linkable polymer and ferrous gluconate," citing column 2, lines 54-57 and Examples 1-11 of the Son '693 reference, and that the "ferrous gluconate reacts with hydrogen sulfide in the formation," citing column 3, lines 7-100. The Examiner adds that the "teaching of a pH of about 9 by Son (see claim 5, and column 3, lines 13-15), anticipates the 'greater than 9' and 'about 10' of the present invention." Again, the Examiner has noted that, "Applicants discovery of a new property of an old composition cannot distinguish over the prior art," citing *In re Tomlinsin,* 150 U.S.P.Q. 623.

Applicant respectfully traverses the Examiner's rejections. One would not have the benefit of Applicant's invention without Applicant's teachings and Applicant's teachings are not taught by the Son '693 reference for the reasons discussed below. *Akzo N.V. et al. v. U.S. International Trade Commission,* 808 F.2d 1471, 1 U.S.P.Q.2d 1241 (Fed. Cir. 1986), *citing* In re Brown, 51 C.C.P.A. 1254, 329 F.2d 1006, 1011, 141 U.S.P.Q. 245, 249 (CCPA 1964) ("In addition, the prior art reference must be enabling, thus placing the allegedly disclosed matter in the possession of the public.") Son '693 lacks the requisite "identity" with Applicant's invention to anticipate it. *Glaverbel Société Anonyme v. Northlake Marketing & Supply Inc.,* 45 F.3d 1550, 33 U.S.P.Q.2d 1496 (Fed. Cir. 1995)("Anticipation requires identity of the invention.").

The drilling fluid described in the Son '693 reference is actually quite different from the fluid of Applicant's invention. Applicant teaches on page 1 at lines 22-30 that good shear thinning rheology, an important property for drilling fluids, is generally achieved in one of two ways. Those ways are: (1) by using a dispersion of colloidal clay minerals such as smectite clays, e.g., bentonite (as used in Son '693); and (2) by using polymers such as xanthan gum or scleroglucan that can be dispersed in aqueous solutions (as used in Applicant's invention).

That is, Son '693 uses a clay based dispersed system whereas Applicant uses a non-dispersed system based on polymers. Son '693 uses an ammonium salt; Applicant does not. *See* Son '693 at column 2, lines 18-20, lines 27-30, and lines 44-50. Son '693 specifically teaches at column 3, lines 13-15 that the pH of the drilling fluid is adjusted to provide a pH in the range of from about 5.0 to 9.0 and, preferably from about 7.0 to 9.0. The pH adjustment is said to

preferably be accomplished by addition of an alkaline agent such as sodium hydroxide. A pH in excess of 9.5 is said to free ammonia gas which is undesirable. Son '693 at column 3, lines 16-25. In distinct contrast, the advantages of Applicant's invention are realized at pH greater than 9.0—the very pH that renders the fluid of the Son '693 reference subject to emission of ammonia gas.

Applicant respectfully submits that the Examiner's position that the "teaching of a pH of about 9 by Son anticipates the 'greater than 9' and 'about 10' of the present invention" is misplaced.

Mention of use of ferrous gluconate in the drilling fluid in the Son '693 reference is in the context of providing a pH and rheology-control agent, but ferrous gluconate is not required for the Son '693 fluid. Son '693 at column 2, line 67- column 3, line 3. Ferrous gluconate in the Son '693 fluid is said to buffer the pH of the fluid against rapid pH change over a wide pH range and to stabilize the fluid by reducing the possibility of free ammonia generation as a result of pH excursions. Son '693 at column 3, lines 3-10. Ferrous gluconate is said to effectively neutralize any increased potential for corrosion which results from the slightly acid pH range of the fluid. Son '693 at column 3, lines 17-20. Son '693 states that the "ferrous gluconate also provides some corrosion protection to the well bore tubular goods by complexing any hydrogen sulfide present in the drilling fluid" at col. 3, lines 7-10, and teaches addition of a corrosion agent such as a quaternary amine salt to provide "additional corrosion protection." Son '693 at column 3, lines 26-29.

The fluid of the Son '693 reference is to provide a clay-based aqueous or emulsion drilling fluid containing dissolved inorganic salts for use in shale and salt formations. The Son' 693 patent teaches a method to avoid flocculation of the clays being used for viscosity control. Son '693 at column 1, lines 58-65. The only reference to "polymer" in Son '693, as cited by the Examiner, is with respect to use in an optional fluid-loss control agent that may or may not be included in the drilling fluid.

In contrast, Applicant's polymer based fluid is for use in a subterranean zone in which hydrogen sulphide is expected to be encountered. Applicant's fluid is not slightly acidic or slightly basic like the fluid in Son '693, but rather is formulated to have a very high pH (preferably at least 11.5) in order to suppress the evolution of hydrogen sulphide gas.

The significance of pH in Applicant's invention should not be discounted. Applicant teaches at page 3, lines 9-14 of his specification that iron has been known in the prior art to form insoluble sulphide upon reaction with hydrogen sulphide. However, Applicant explains that iron has been found in the prior art to be generally unsuitable as a sulphide scavenger because the iron compounds have not been stable in solutions at high pH—both iron (II) and iron (III) precipitate as gelatinous iron hydroxide, which would have unacceptable effects on the rheology of the drilling fluid. Applicant noted in his specification at page 3, line 22- page 4, line 9, the teaching of an iron chelate as a downhole hydrogen sulphide scavenger in drilling mud by Jeffrey et al. (US Patent No. 4,756,836), particularly in water based clay muds (the type mud used in the Son '563 reference). However, the iron chelates of Jeffrey et al have limited stability at high pH. Iron in those chelates is well known to tend to precipitate out as ferric hydroxide at a pH greater than 9, and most at a pH below 9.

Thus, an inorganic chemistry textbook might typically list metals that will precipitate sulphide and thus that could potentially be used as sulphide scavengers. How to actually use the metals as scavengers in a practical application, as in drilling fluids without adversely affecting the rheology of the drilling fluid, is the point of invention. Reviewing the chemistry of iron, one skilled in the art knows that iron in solution can be precipitated by several anions, including hydroxide and sulphide. If iron is to be used as a sulphide scavenger in a drilling mud, then the iron must be precipitated as sulphide not as hydroxide. Iron precipitated as a hydroxide is a gelatinous material which would interfere with the viscous properties of the drilling fluid in an undesirable way. Iron salts, such as ferrous chloride, are soluble in water, but that solubility is a function of pH. For example, at pH 5-6, ferrous iron will remain in solution, but at pH above that range the iron will be precipitated as the hydroxide. In order to stabilize iron in solution at higher pH, it is necessary to complex the iron ions with suitable complexing agents. However, the stability of the various complexes that can be used depends upon pH. The higher the pH, the more likely it is that the iron will be precipitated as iron hydroxide. Moreover, the fact that an iron complex is stable up to pH 9 does not mean that it will be stable up to pH 11, pH 12 or higher. To demonstrate such a leap in reasoning, one could consider saying that because iron chloride is stable in solution at pH 6, it can be used as a sulphide scavenger at pH 12, when in fact it cannot. There are many iron complexes which are stable at pH 9 which would not be stable or satisfactory at pH 12.

U.S. Serial No. 10/781,389 (Attorney Dkt: HALB:001D1)
Art Unit: 1712; Examiner TUCKER, PHILIP C.

The Federal Circuit has repeatedly indicated that to find anticipation of claims, prior art embodiments must possess the properties expressly recited in the claims. Property limitations can serve to distinguish claimed subject matter from other products. *E.g., E.I du Pont de Nemours & Co. v. Phillips Petroleum Co.*, 849 F.2d 1430, 7 U.S.P.Q.2d 1129 (Fed. Cir. 1988). Applicants respectfully submit that the Examiner can not satisfy the requisites of 35 U.S.C. § 102 by attributing Applicants' teachings to Son '693.

Applicant respectfully submits that the Examiner's conclusion that the Son '693 reference anticipates Applicant's invention is erroneous. Son '693 is directed to a different problem than Applicant's invention and is directed to a different solution. The Son '693 reference never teaches or suggests use of ferrous gluconate as a solution to the problem of Applicant's invention—the problem of precipitating or removing hydrogen sulphide from a polymer based drilling fluid at a high pH, at a pH greater than 9. The Son '693 reference never teaches or suggests use of the fluid taught therein at pH higher than 9.0 and specifically teaches away from use of the fluid at higher pH levels. The Son '693 reference never teaches or suggests use of ferrous gluconate to remove hydrogen sulphide from a drilling fluid used in drilling a formation yielding such copious amounts of hydrogen sulphide that the drilling fluid has to have a high pH to put the hydrogen sulphide in the drilling fluid so as to avoid emission of the hydrogen sulphide as a gas from the formation during the drilling. The Son '693 reference never teaches or suggests use of ferrous gluconate in polymer based drilling fluid at any pH.

To be responsive to the Examiner and to further emphasize and claim the distinctions in and advantages of Applicant's invention, Applicant has amended claims 1-6, 9, 10, 12 and 16. Applicant respectfully requests the Examiner enter the amendments and reconsider his position and Applicants amended claims. Applicant respectfully submits that the claims as amended are now in condition for allowance and Applicant respectfully requests the Examiner to allow the application to proceed to issue.

Respectfully submitted,

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Karen B. Tripp, Reg. No. 30,452
Attorney at Law
P.O. Box 1301
Houston, Texas 77251-1301
(713) 658-9323 phone

U.S. Serial No. 10/781,389 (Attorney Dkt: HALB:001D1)
Art Unit: 1712; Examiner TUCKER, PHILIP C.

(713) 658-9410 fax
ktripp@tripplaw.com e-mail

c: Craig W. Roddy, Esq.